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NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE, --ETC(U)
SEP 81 W E BUSH DACW62-81-C-0056

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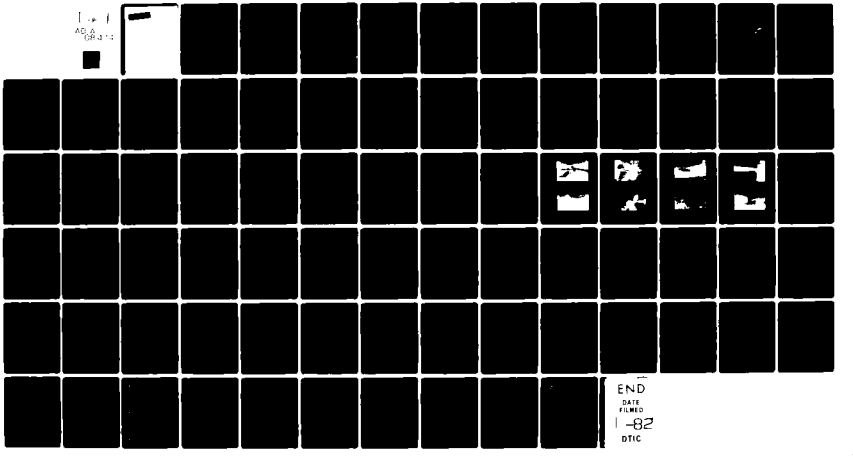

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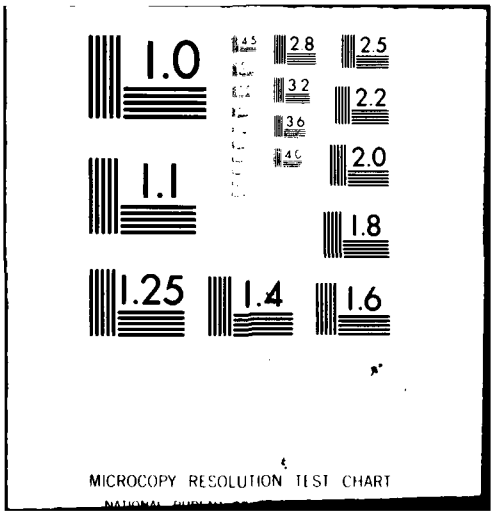
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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A108 474 / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* National Program of Inspection of Non-Federal Dams, Tennessee. Grand Valley Dam No. 2 (Inventory Number TN 06925) near Hickory Valley, TN, Hardeman County, TN, Hatchie River Basin	5. TYPE OF REPORT & PERIOD COVERED Phase 1 Investigation Report 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s) DACW-62-81-C-0056
9. PERFORMING ORGANIZATION NAME AND ADDRESS Winsett, Simmonds, Consterdine & Associates, Inc. P.O. Box 40045 Memphis, TN 38104	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Nashville P.O. Box 1070 Nashville, TN 37202	12. REPORT DATE September, 1981 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)* Tennessee Department of Conservation Division of Water Resources 4721 Trousdale Drive Nashville, TN 37220	15. SECURITY CLASS. *(of this report)* Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Dams
Dam Safety
National Dam Safety Program
Grand Valley Dam No. 2, TN
Hickory Valley, TN
Hardeman County, TN
Embankments
Visual Inspection
Structural Analysis

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Grand Valley Dam No. 2 is located in Hardeman County, Tennessee seven miles east of Hickory Valley, Tennessee and is an earth fill embankment 16 feet high and 560 feet long with a crest width of 22 feet. Facilities for discharge for the reservoir are located in the left abutment and include a 24 inch corrugated metal pipe culvert through the dam, and an emergency spillway cut into the right abutment. This spillway is trapezoidal shaped with a bottom width of 50 feet. A paved road fill crosses the spillway at approximately the location of the control section and effectively cuts off the spillway from use. The

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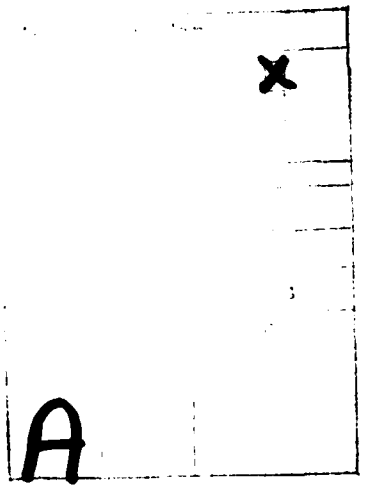
embankment slopes are 1 vertical on 3 horizontal from the water line to the top of the dam on the upstream slope. The downstream slope averages 1 vertical on 3 horizontal. The upstream slope is free of undesirable growth and debris but the downstream slope is covered with high grass and small saplings. On the basis of hydraulic analysis, flood storage (95 acre-feet) and spillways are insufficient to safely pass the 1/2 Probable Maximum Flood (PMF) which the Office of the Chief of Engineers (OCE) Guidelines specify to be the design flood for a dam in the small size and high hazard categories. The dam is in the small size category and has a downstream hazard potential classification of high by the USCE and "1" by the State of Tennessee. At this time, the dam is considered to be "Unsafe Non-emergency. It is recommended that a qualified engineer be engaged to: Investigate seepage at the left abutment and recommend remedial measures if necessary; make an investigation of the downstream slope to determine if unsafe conditions exist and if any are found, design remedial measures to provide a safe embankment; determine the condition of the service spillway pipe throughout and the causes of seepage along the pipe; redesign the emergency spillway in the right abutment so that it has the capability of safely passing the 1/2 PMF and the road crossing the spillway so that it will not obstruct the flow; recommend stabilization measures to protect both the upstream and downstream slopes from wave action; develop an emergency action plan to alert downstream residents in the event of a major problem developing with the dam; and develop an inspection and maintenance schedule for the dam on at least an annual basis.



DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

IN REPLY REFER TO
ORNED-G

21 SEP 1981

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Furnished herewith is the Phase I Investigation Report on Grand Valley Dam No. 2 near Hickory Valley, Tennessee. The report was prepared under the authority and provisions of PL 92-367, the National Dam Inspection Act, dated 8 August 1972.

The report presents details of the field inspection, background information, technical analyses, findings, and recommendations for improving the condition of the dam.

Based upon the inspection and subsequent evaluation, Grand Valley Dam No. 2 is classified as unsafe-nonemergency due to insufficient storage and spillway capacity to pass the one-half probable maximum flood and other serious deficiencies.

We do not consider this an emergency situation at this time, but the recommendation concerning project modifications to allow safe passage of the design flood and others contained in this report should be undertaken in the near future.

Public release of the report and initiation of public statements fall within your prerogative. However, under provisions of the Freedom of Information Act, the Corps of Engineers is required to respond fully to inquiries on information contained in the report and to make it accessible for review on request.

Your assistance in keeping me informed of any further developments will be appreciated.

Sincerely,

Kenneth W. Ashley, LTC
for LEE W. TUCKER
Colonel, Corps of Engineers
Commander

1 Incl
As stated

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220

PHASE I INSPECTION

GRAND VALLEY DAM NO. 2

HARDEMAN COUNTY, TENNESSEE

Prepared By:

WINSETT-SIMMONDS, CONSTERDINE & ASSOCIATES, INC.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

Name of Dam	Grand Valley Dam No. 2
County	Hardeman
Stream	Gin Pond Branch
Date of Inspection	April 14, 1981

This investigation and evaluation report was prepared for the Tennessee Department of Conservation, Division of Water Resources by Winsett-Simmonds, Consterdine & Associates, Inc., P.O. Box 40045, Memphis, TN 38104.

Prepared By:

Wm. E. Bush, P.E., Director
Civil & Water Resources Engineering

ABSTRACT

Grand Valley Dam No. 2 is located in Hardeman County, Tennessee seven miles east of Hickory Valley, Tennessee, and is an earth fill embankment 16 feet high and 560 feet long. The crest width is 22 feet. Facilities for discharge for the reservoir are located in the left abutment and include a 24 inch corrugated metal pipe culvert through the dam, and an emergency spillway cut into the right abutment. This spillway is trapezoidal shaped with a bottom width of 50 feet. A paved road fill crosses the spillway at approximately the location of the control section and effectively cuts off the spillway from use.

The embankment slopes are 1 vertical on 3 horizontal from the water line to the top of the dam on the upstream slope. The downstream slope averages 1 vertical on 3 horizontal. The upstream slope is free of undesirable growth and debris but the downstream slope is covered with high grass and small saplings.

On the basis of hydraulic analysis, Grand Valley Dam No. 2 flood storage (95 acre-feet) and spillways are insufficient to safely pass the ½ Probable Maximum Flood (PMF), which the Office of the Chief of Engineers (OCE) Guidelines specify to be the design flood for a dam in the small size and high hazard categories.

Grand Valley Dam No. 2 is in the small size category and has a downstream hazard potential classification of high by the USCE and "1" by the State of Tennessee. At this time the dam is considered to be "Unsafe Non-emergency.

It is recommended that a qualified engineer be engaged to: Investigate seepage at the left abutment and recommend remedial measures if necessary; make an investigation of the downstream slope to determine if unsafe conditions exist and if any are found, design remedial measures to provide a safe embankment; determine the condition of the service spillway pipe throughout and the causes of seepage along the pipe; redesign the emergency spillway in the right abutment so that it has the capability of safely passing the ½ PMF and the road crossing the spillway so that it will not obstruct the flow; recommend stabilization measures to protect both the upstream and downstream slopes from wave action; develop an emergency action plan to alert downstream residents in the event of a major problem developing with the dam; and develop an inspection and maintenance schedule for the dam on at least an annual basis.

TABLE OF CONTENTS

OVERVIEW PHOTO

PHASE I INSPECTION

GRAND VALLEY DAM NO. 2

HARDEMAN COUNTY, TENNESSEE

SECTION 1 - GENERAL

1.1 Authority - The Phase I inspection of this dam was carried out under the authority of the Tennessee Code Annotated 70-2501 to 70-2530, "The Safe Dams Act of 1973", in cooperation with the Corps of Engineers under the authority of PL 92-367, "The National Dam Inspection Act".

1.2 Purpose and Scope - This report is prepared under guidance contained in Department of the Army, Office of the Chief of Engineers, Recommended Guidelines for Safety Inspection of Dams, for a Phase I investigation. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspections. Detailed investigation and analysis involving topographic mapping, subsurface investigation, testing and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. Additional data or data furnished containing incorrect information could alter the findings of this report.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

1.3 Past Inspections - An inventory reconnaissance trip was made to Grand Valley Dam No. 2 by the Division of Water Resources, State of Tennessee. (See Appendix F).

1.4 Miscellaneous Details - On the day of the Phase I inspection, the weather was cloudy with temperatures in the mid 70's and the wind was gusty. The level of the lake was approximately 1.2 feet above the invert of the service spillway.

1.5 Inspection Team Members - Field inspection was performed by the following Winsett-Simmonds, Consterdine & Associates, Inc. personnel:

William E. Bush, P.E.
Civil Engineer

Dr. Fred H. Kellogg, P.E.
Geotechnical Engineer

The team was accompanied by Messrs. George Moore and David Roe of the Tennessee Division of Water Resources.

SECTION 2 - PROJECT DESCRIPTION

2.1 Location - Grand Valley Dam No. 2 is located in Hardeman County, Tennessee seven miles east of Hickory Valley, Tennessee. It can be located on USGS Map, "Hebron, Tennessee", at longitude 89°00'00" and latitude 35°08'43".

2.2 Description

2.2.1 Embankment - The Grand Valley Dam No. 2 is an earth embankment dam with a north-south orientation, a maximum height of 16 feet, and a length of 560 feet. The crest width is 22 feet. The upstream slope averages 1V on 3.0H from the water line to the top of the dam. The downstream slope averages 1V on 3.0H. The soils exposed here are predominately SC clayey sands and CL low plasticity clays with chert fragments. Embankment sketches are provided in Exhibit B.

2.2.2 Service Spillway/Low Level Outlet - The service spillway is a 24 inch corrugated metal pipe culvert through the dam. No anti-vortex baffle or other entrance improvements were visible. Debris protection was provided by a woven wire box type enclosure.

2.2.3 Emergency Spillway - An emergency spillway was cut into the right abutment. It was trapezoidal shape with a bottom width of 50 feet. A paved road fill crosses the spillway at the approximate location of the control section and effectively cuts off the spillway from use.

2.2.4 Reservoir and Drainage Area - The reservoir has a surface area of 13.2 acres at normal pool elevation with a fetch of 1500 feet. The normal impounding capacity of the reservoir is estimated to be 70 acre-feet with an additional 95 acre-feet of flood storage. The drainage area is 229 acres and the predominate soil group is Memphis-Lexington-Loring.

2.2.5 Miscellaneous - The dam was reported to have been built in the 1930's as a farm pond and was enlarged in 1965. Further improvements were made in 1973.

SECTION 3 - INSPECTION FINDINGS

3.1 Specific Findings

3.1.1 Embankment

Geology - The soils exposed at Grand Valley Dam No. 2 are predominantly SC clayey sands and CL low plasticity clay with chert fragments.

Crest - The longitudinal alignment of Grand Valley Dam No. 2 is straight with a north-south orientation. The crest is traversed with a paved road 15 feet in width. There were no longitudinal or transverse surface cracks observed. The general condition of the surface was good including the shoulders along the pavement.

Upstream Slope - The upstream slope was free of undesirable growth and debris. An area on the upstream face located at the right abutment appears to be silted in and covered with marsh grass. Small areas of sloughing were found on the upstream face. In one area there is a jub that appears to be undercutting the upstream face about ten feet from the pavement's edge. Several other jugs were noted along the face of the dam. Several of these jugs penetrate the slope several feet toward the crest. Most of the jugs were located within 100 feet of the right abutment. A slightly benched area occurred near the center of the dam.

Downstream Slope - The downstream slope is covered with high grass and small saplings. This grass makes it difficult to observe the ground conditions on the slope. The toe of the dam is 150 to 200 feet from the tailwater of Lake No. 1. Tall swamp grass in the area below the toe of the dam prevented a close observation of boils, seeps or other undesirable conditions. A small bench runs horizontally along the entire backslope. No surface cracks were noted nor evidence of heaving at the embankment toe.

Abutments - There was some erosion noted along the contact of the embankment with the abutment in the form of gullies at both ends of the dam. Also, a good bit of sand has eroded out of a gulley that parallels the road at the left abutment.

3.1.2 Seismic Zone - Grand Valley Dam No. 2 is in Seismic Zone No. 2. No record of any stability analysis could be found.

3.1.3 Seepage - Dampness was noted on the backslope of the dam. One area of dampness was located near the toe of the dam at about the center of the dam and appears to be wet most of the time. This swampy area goes along the toe of the dam just below a bench which is the beginning of the swamp grass. At the left abutment, there is a small trickle of water from a gulley, reddish in color, that occurred approximately three to four feet below the pool elevation of the dam. No toe drainage system was observed in this structure.

3.1.4 Spillways - The service spillway is essentially a culvert through the dam and provides no method to completely draw down the impoundment. The spillway is susceptible to being closed with debris and it was reported to have been closed up by beavers on several occasions. The wire enclosure appears to be adequate at the present time. The condition of the outlet structure is fair. The bituminous coating has failed on the exposed pipe with approximately 80 percent of the coating sloughed off. Rust spots were observed on the outside of the exposed pipe. The inlet end was partially underwater and could not be fully observed, but rust is appearing at the inlet end. Leakage was observed at the outlet along both sides and under the pipe.

Emergency Spillway - There is approximately two feet of fall along the crest from the right abutment to the left abutment. The emergency spillway was originally designed in the right abutment. Flow through this emergency spillway was effectively cut off by the building of the road fill and consequently the low portion of the crest at the left abutment presently acts as the emergency spillway. Should flow occur over the dam at this point, the increased velocity of the water crossing the pavement and down the backslope would cause severe erosion of the backslope and possible failure of the structure.

3.1.5 Downstream Inspection and Hazard Classification - Grand Valley Dam No. 2 has a downstream hazard potential classification of high. This classification was made because of the probable

damage to Grand Valley Dam No. 1 should Grand Valley Dam No. 2 fail, and possible damage to the developing subdivision below Grand Valley Dam No. 1 should it fail.

3.1.6 Hydrology and Hydraulics - According to O.C.E. Guidelines, dams with a high hazard and small size classification should have the storage and spillway capacity to pass the ½ PMF without overtopping the dam. The Probable Maximum Precipitation (PMP) of 29.7 inches in six hours yields a ½ PMF of 11.94 inches. Time of concentration of the uncontrolled area of Grand Valley Dam No. 2 was estimated to be 0.97 hours and the flood storage from normal pool to the low point of the top of the dam is estimated to be 95 acre-feet. Routing of the ½ PMF (Antecedent Moisture Condition II) produced a peak outflow of 562 cfs, which overtopped the dam by 1.4 feet. This storm produced a flow over the dam in excess of 6.5 hours.

The 100-year, 6-hour flood was routed through the structure. Grand Valley Dam No. 2 contained this storm with a freeboard of 2.5 feet. The 1-10 day, 100-year storm was routed through the structure and did not produce flow over the top of the dam.

3.2 Conclusions and Recommendations

3.2.1 Conclusions

a. Hydraulic analysis indicates that the Grand Valley Dam No. 2 spillway is inadequate to pass the design flood. Outflow resulting from the ½ PMF will overtop the dam by 1.4 feet with a total duration of 6.5 hours.

b. If the seepage that was observed on both sides and on the bottom of the service spillway at its outlet is from the reservoir, a potential for dam failure exists.

c. The area at the toe of the downstream slope of Grand Valley Dam No. 2 appears to be wet all the time. Also, at the left abutment, there is a small trickle of water from a gulley, reddish in color. The source of this water may be from the reservoir. Dam failures have been experienced by seepage at this contact.

d. The upstream slope of Grand Valley Dam No. 2 needs protection from wave action to prevent further erosion and sloughing on this slope.

e. On the basis of engineering judgment and visual observation, both the upstream and downstream slopes appear to be stable at this time.

f. The seismic resistance of this dam is unknown, but, under this program, dams in Seismic Zone 2 may be assumed to be adequate against seismic loading if they are judged adequate in static stability requirements.

g. Grand Valley Dam No. 2 is the upstream dam in a series of two dams. Failure of this structure could cause failure of the downstream structure, Grand Valley Dam No. 1, and intensify the damage to the developed subdivision below Grand Valley Dam No. 1.

h. Grand Valley Dam No. 2 is considered as "Unsafe-Non-emergency" because it is a dam with obviously serious

deficiencies which clearly could develop or are developing into failure modes but do not yet pose the threat of immediate failure.

3.2.2 Recommendations - Remedial work should begin as soon as possible. The dam conditions should be checked daily by the owner for changes in the quantity and color of the seepage until remedial work is done and consideration should be given to methods and the length of time required to draw down the reservoir. Qualified engineers should be engaged immediately to:

a. Recommend project modification that will allow the spillway to safely pass the design flood.

b. Investigate seepage at the left abutment and recommend remedial measures.

c. Determine the condition of the service spillway pipe throughout and the source of seepage along the pipe and design remedial measures to correct the problem.

d. After the owner clears the downstream slope, make an investigation to determine if unsafe conditions exist, and if any are found, design remedial measures to provide a safe embankment.

e. Recommend stabilization measures to protect both the upstream and downstream slopes from wave action.

f. Develop a program for investigation and maintenance of the structure and re-examination on an annual basis.

g. Develop an emergency action plan to alert downstream residents in the event a major problem develops with the dam.

In addition, the owner should:

a. Remove the undesirable vegetation on the downstream slope and at the toe of the downstream slope to the tailwater of Grand Valley Dam No. 1.

b. Be exceptionally watchful to prevent closure of the service spillway by waterborne debris or beavers. Closure of the service spillway would result in higher water elevations and increased flows along the outside of the pipe.

SECTION 4 REVIEW BOARD FINDINGS

The Interagency Review Board for the National Program of Inspection of Non-Federal Dams met in Nashville on 16 July 1981 to examine the technical data contained in the Phase I investigation report on Grand Valley Dam No. 2. The Review Board considered the information and recommended that (1) recommendation C should also have the qualified engineer design remedial measures after the cause of seepage has been determined, and (2) the owner should periodically check for signs of beavers blocking the spillway intake. They agreed with other report conclusions and recommendations. A copy of the letter report presented by the Review Board is included in Appendix H.

APPENDIX A

DATA SUMMARY SHEET

APPENDIX A
DATA SUMMARY SHEET

A.1 DAM - Grand Valley Dam No. 2

A.1.1 Type - Earth Fill

A.1.2 Dimensions and Elevations - Elevations were determined from assuming a normal pool elevation as shown on the USGS 15 minute quadrangle, "Hebron, Tennessee", for Grand Valley Lake Dam No. 1.

a.	Crest length	560 feet
b.	Crest width	22 feet
c.	Height	16.0 feet
d.	Crest elevation	469.6 feet
e.	Service spillway elevation	463.7 feet
f.	Emergency spillway elev. right	Obstructed by road
g.	Emergency spillway elev. left	None
h.	Embankment slope, U/S (from water surface to crest	1V on 3.0H
i.	Embankment slope, D/S (from lower slope to crest)	1V on 3.0H
j.	Size classification	Small

A.1.3 Zones, Cutoffs, Grout Curtains — None

A.1.4 Instrumentation — None

A.2 RESERVOIR AND DRAINAGE AREA

A.2.1 Reservoir - (Normal pool elevation 464.9, 4.7 feet below the effective crest).

a.	Surface area	13.2 acres
b.	Length of pool	1500 feet
c.	Capacity (Normal pool)	70.0 acre-feet
d.	Maximum surface area	19.2 acres
e.	Flood storage	95 acre-feet

A.2.2 Drainage Area

a.	Size - 229 acres (0.36 square miles)	
b.	Characteristics:	
	Average watershed slope	3.2%
	Soil	Memphis-Lexington-Loring
	Cover	Open land 56.2%, Woodland 37.5%, Water 6.3%
c.	Runoff PMF (AMC II)	23.88 inches

d.	Runoff ½ PMF (AMC II)	11.94 inches
e.	Runoff P_{100} (AMC III)	3.43 inches

A.3 OUTLET STRUCTURES

A.3.1 Drawdown Facilities - None

A.3.2 Service Spillway - 24 inch CPM through dam without riser (culvert type).

a.	Upstream invert elevation	464.9 feet MSL
b.	Length	114 feet (est.)
c.	Maximum discharge capacity	37.5 cfs (Top of dam)

A.3.3 Emergency Spillway (right abutment) - Not effective. Road across control section renders it inoperable.

A.3.4 Emergency Spillway (left abutment) - None

A.4 HISTORICAL DATA

A.4.1 Construction Date - Enlarged 1965 (original dam 1930-39), improved 1973.

A.4.2 Designer - Unknown

A.4.3 Builder - Unknown

A.4.4 Owner - Grand Valley Property Owners Association

A.4.5 Previous Inspection - None

A.4.6 Seismic Zone - 2

A.5 DOWNSTREAM HAZARD DATA

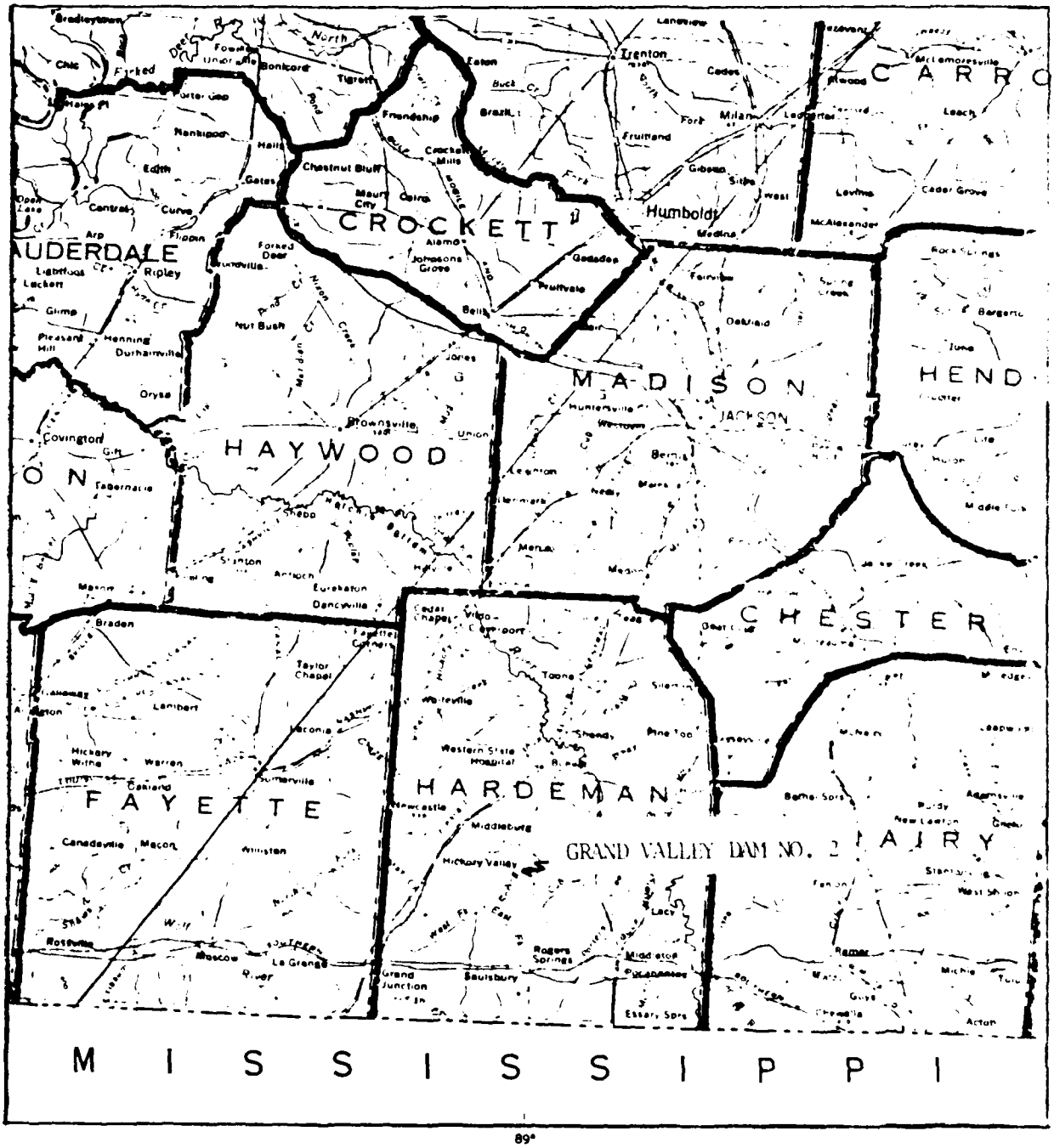
A.5.1 Downstream Hazard Potential Classification

a.	Corps of Engineers	High
b.	State of Tennessee	I

A.5.2	Persons in Probable Flood Path	Unknown
A.5.3	Downstream Property	Subdivision for mobile homes
A.5.4	Warning Systems	None

APPENDIX B

SKETCHES AND LOCATION MAPS



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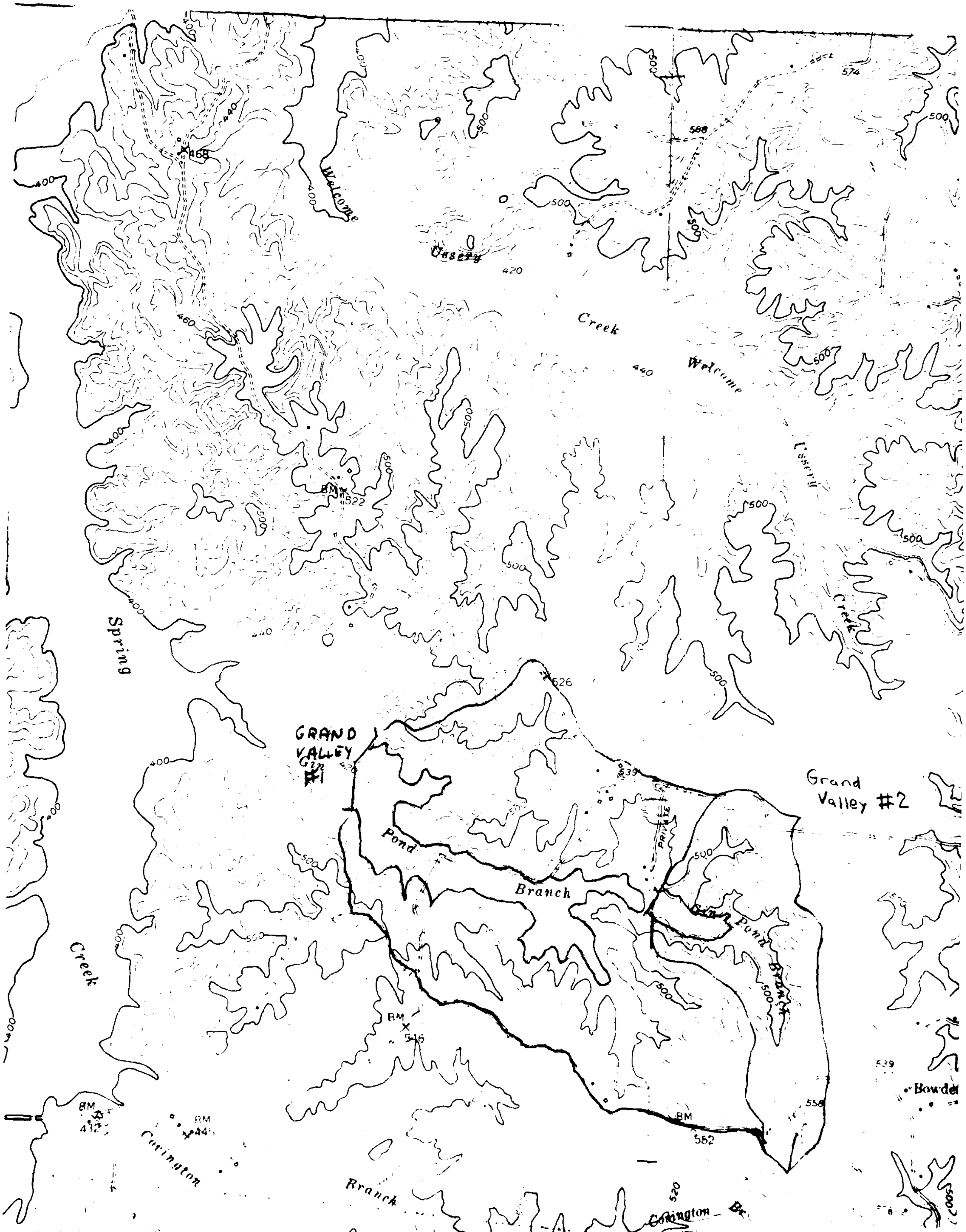
LOCATION MAP



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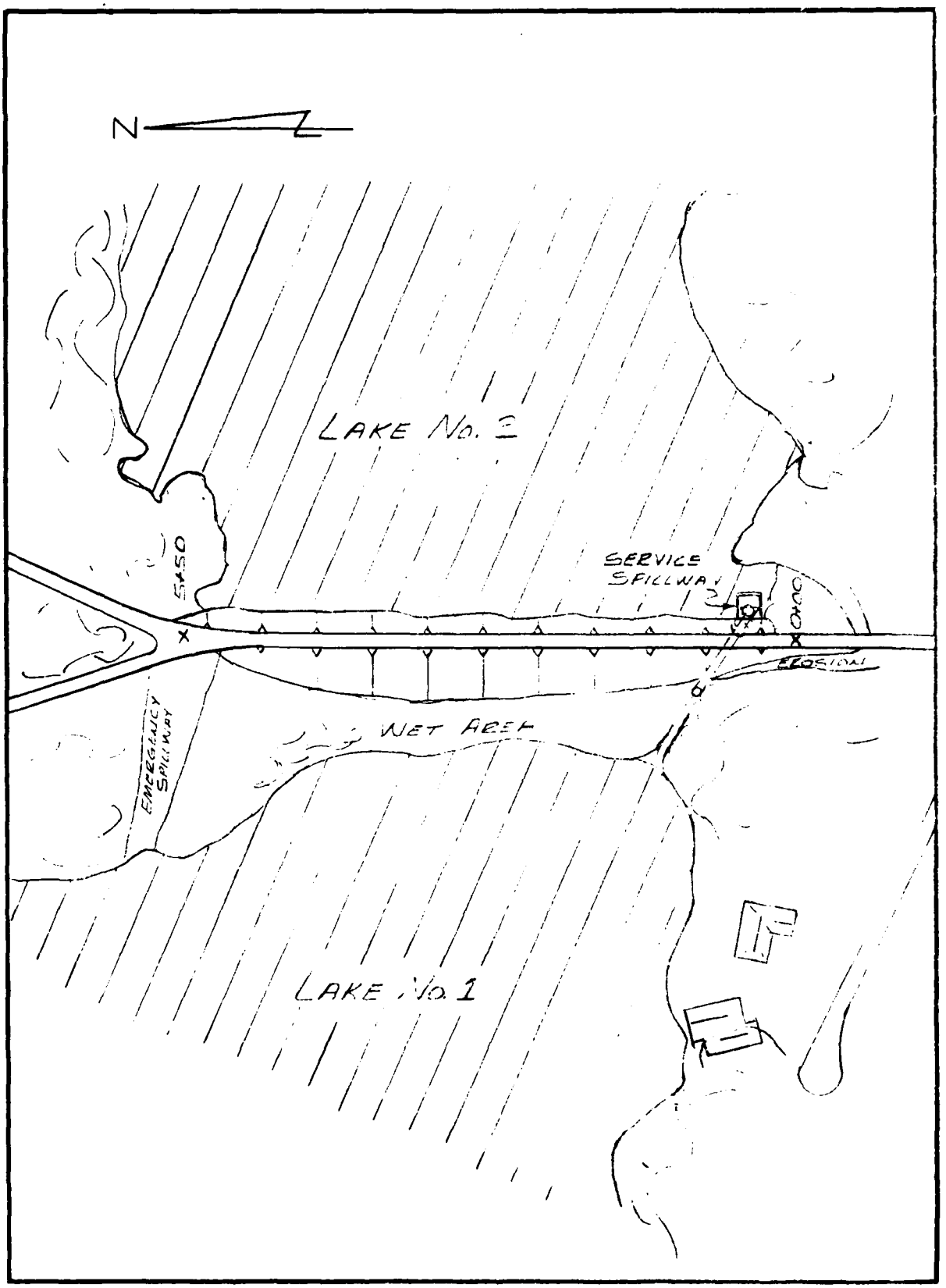

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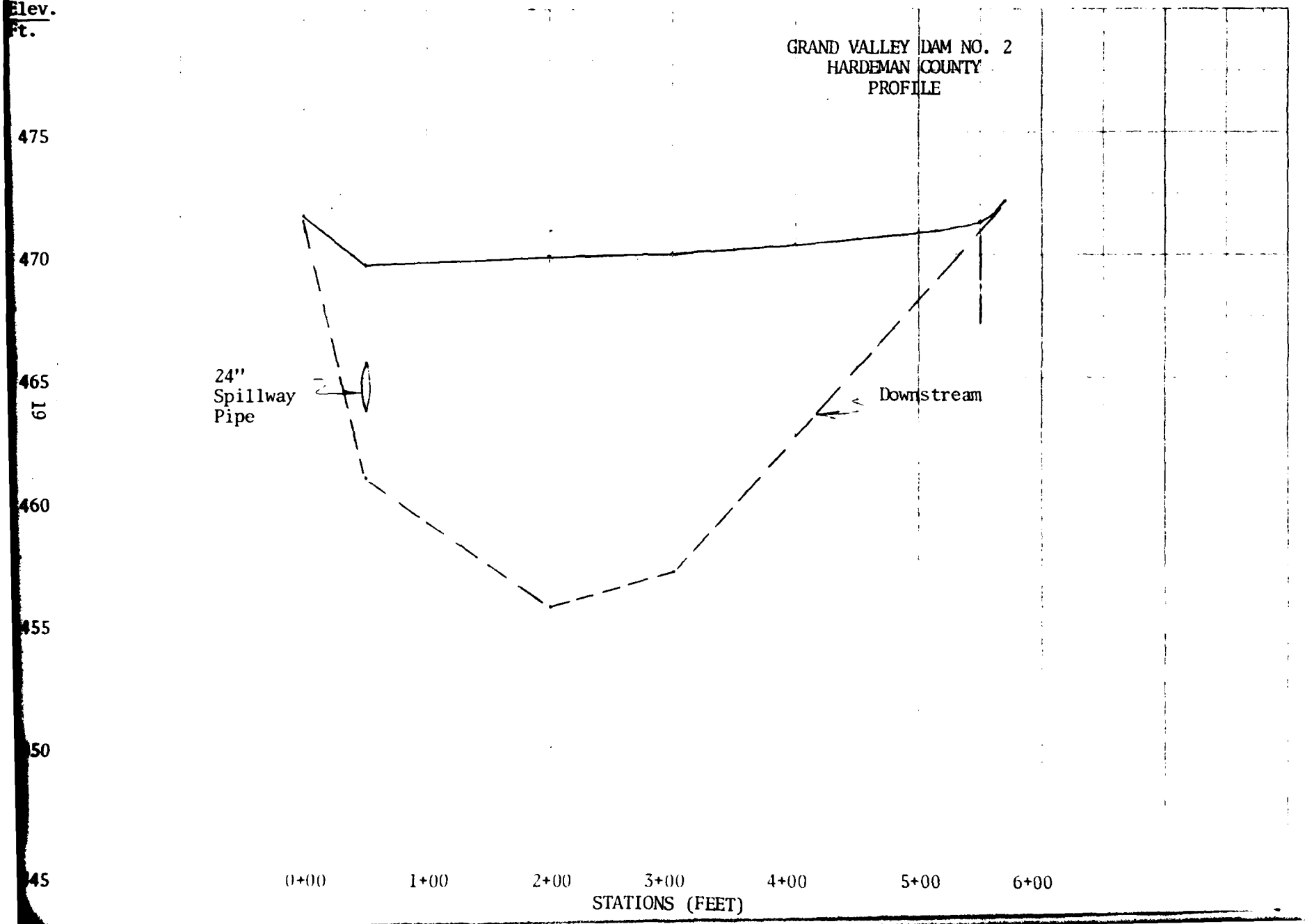

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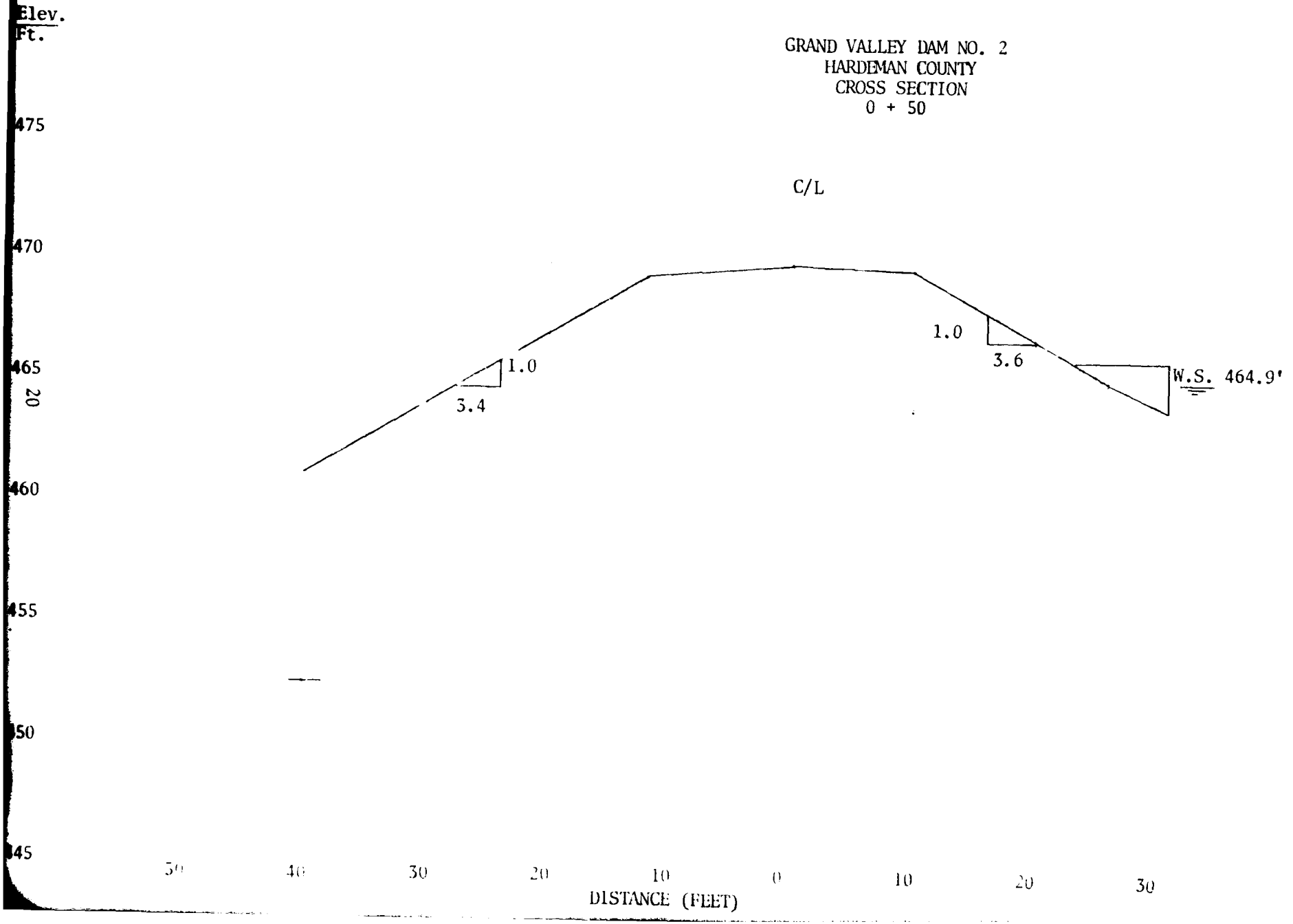

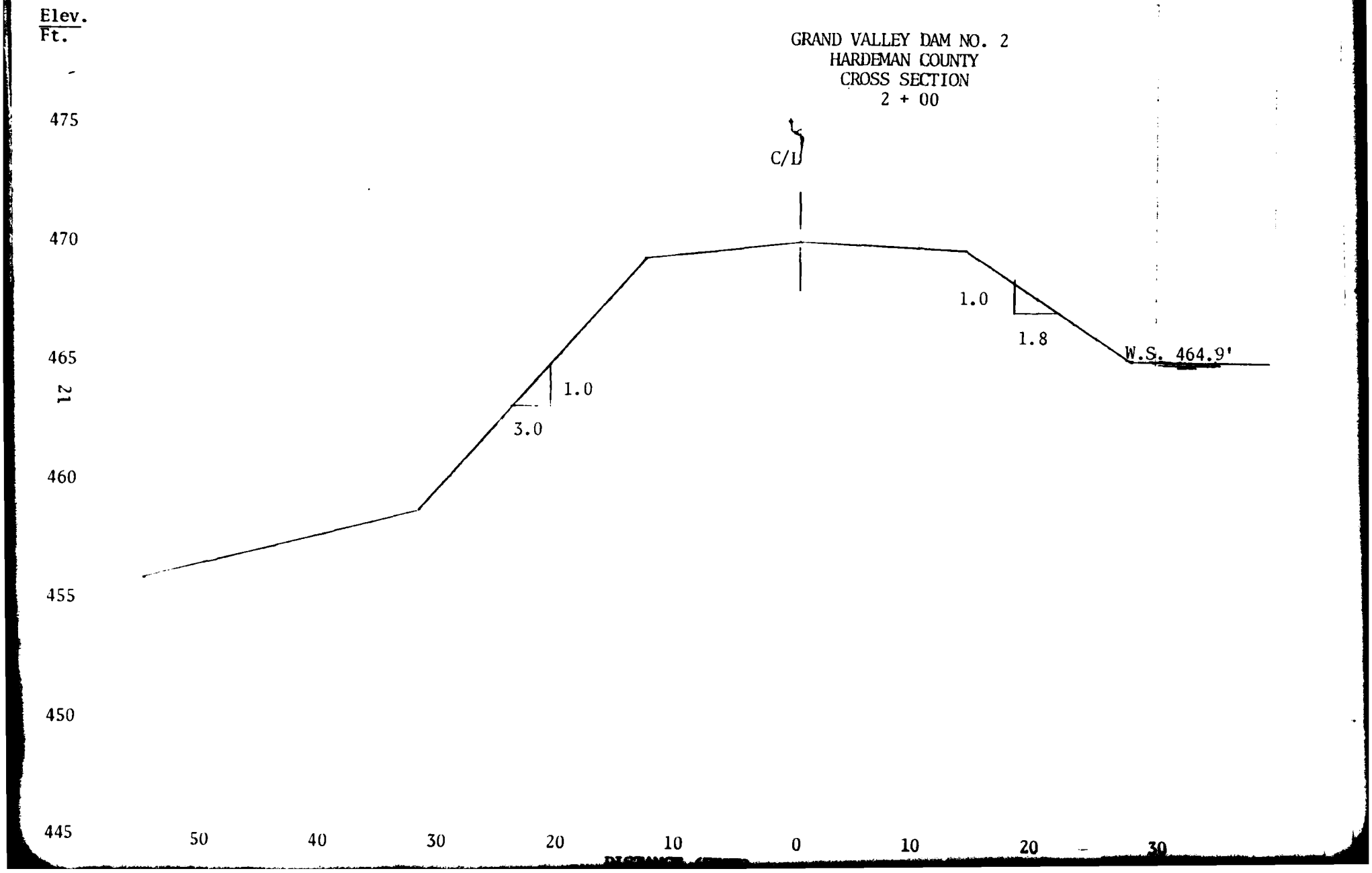
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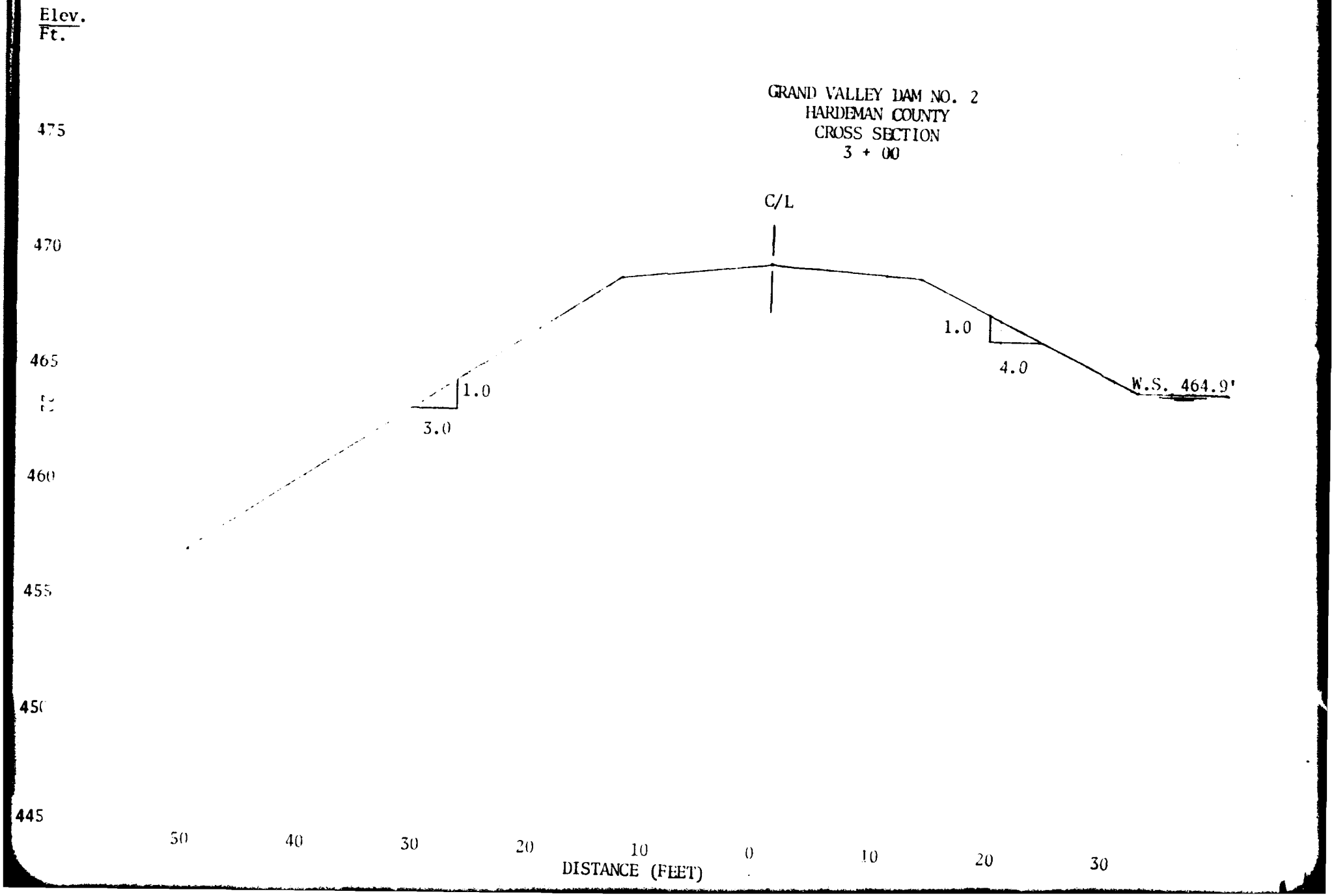
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APPENDIX C

PHOTOGRAPHIC RECORD

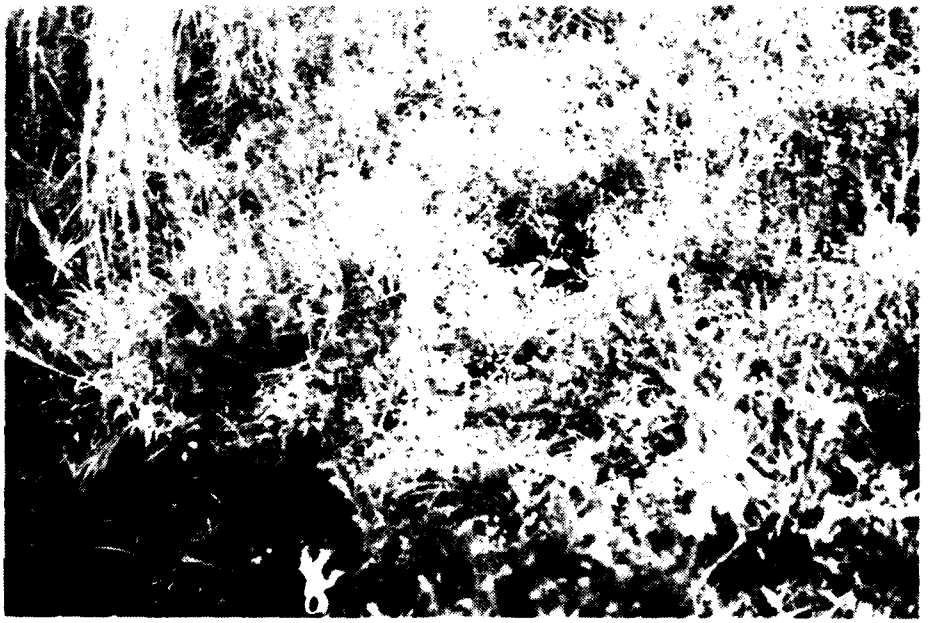
1. Upstream slope and top of Grand Valley Dam No. 2. Note erosion at road side ditch in left abutment.

2. Downstream slope of Grand Valley No. 2.

3. Inlet for service spillway, Grand Valley Dam No. 2. Note debris at pipe.

4. Outlet end of service spillway, Grand Valley Dam No. 2. Note water seeping along side and bottom of pipe.

5. Emergency spillway cut into right abutment of Grand Valley Dam No. 2. Note road fill across control section.



6. Jug (hole) in upstream slope of Grand Valley Dam No. 2.

7. Impoundment above Grand Valley Dam No. 2.

8. Tailwater of Grand Valley Dam No. 1 at downstream toe of Grand Valley Dam No. 2.

APPENDIX D

INSPECTION TEAM TRIP REPORTS

TRIP REPORT
GRAND VALLEY DAM NO. 2
HARDEMAN COUNTY, TENNESSEE

GENERAL ENGINEERING OBSERVATIONS
April 14, 1981

GENERAL. An engineering inspection of the Grand Valley Lake Dam No. 2 was made with Dr. Fred H. Kellogg, Kellogg Engineering, and George Moore and David Roe of the Tennessee Division of Water Resources. The weather was cloudy with temperatures in the 70's. The wind was gusty. The lake level was at the elevation of the invert of the service spillway.

EMBANKMENT. The longitudinal alignment of Grand Valley Dam No. 2 is straight with a north-south orientation. The crest is traversed with a paved road approximately 15 feet in width. There were no longitudinal or transverse surface cracks observed. The general condition of the surface was good including the shoulders along the pavement. The average top width of the dam is estimated to be 25 feet.

The upstream slope was free of undesirable growth and debris. An area on the upstream face located at the right abutment appears to be silted in with marsh grass growing throughout. The upstream face generally has a 3:1 slope. Small areas of sloughing are known on the upstream face, in one area there is a jug that appears to be undercutting the bank about ten feet from the pavement's edge. Several other jugs were noted along the face of the dam. Several of these jugs penetrate the slope several feet toward the crest. Most of the jugs were located within 100 feet of the right abutment. A few small benches were also observed which could have been cut by high water. Many crayfish holes were also noted near the left abutment, but no jugs were noted.

The downstream slope is covered with high grass and a few small saplings. This grass made it difficult to observe conditions along the slope. The downstream slope is sloughing in the area of the service spillway. It is estimated that the toe of the downstream slope is approximately 200 feet from the tailwater of Dam No. 1. The downstream slope is about 3:1. An area of dampness was located above the toe near the center of the dam and appears to be wet most of the time. This swampy area goes along the toe of the dam just below a bench which is the beginning of the swamp grass. Again, the thick vegetation prevented a close observation of the soil. The area along the toe is swampy and difficult to walk through, and is grown up with swamp grass and willows. As noted before, a bench runs horizontally along the entire backslope. No surface cracks were noted, nor was there evidence of heaving at the embankment toe. There is no toe drainage system installed in this structure.

Some erosion of the fill contact with the outlet structure was observed. Seeps occur along both sides of the pipe in rilled areas approximately two feet out from the pipe.

There was some erosion noted along the contact of the embankment with the abutment in the form of gullies at both ends of the dam. At the left abutment there was a small trickle of water from a gulley, reddish in color, that occurred approximately 3 to 4 feet below the pool elevation of the dam. Also a good bit of sand has eroded out of the gulley that parallels the road at the left abutment.

INSTRUMENTATION. There were no monuments for surveys nor were there any observation wells, weirs, piezometers nor other instrumentation.

SPILLWAYS. Grand Valley Dam No. 2 has a 24 inch corrugated metal pipe that extends through the dam similar to a hooded inlet type. The 24 inch corrugated metal pipe protudes from the upstream face of the dam without a hood cover or vortex baffle of any form and is protected from debris with a woven wire screen. It is understood from the representative of the Owners Association that beavers have been a problem in the past and have stopped up the pipe on several occasions. The outlet structure condition is fair. The bituminous coating has failed on the exposed pipe with approximately 80 percent sloughed off. No rust spots were noted on the outside of the exposed outlet pipe. The inlet end was partially under water and could not be observed. Leakage was observed under both sides of the pipe at the outlet.

EMERGENCY SPILLWAY. There is approximately two feet of fall along the crest from the right abutment to the left abutment. The emergency spillway was designed in the right abutment. The flow through the emergency spillway was effectively cut off by the building of the road and consequently the low portion at the crest at the left abutment now acts as the emergency spillway. Should flow occur over the dam at this point, the increased velocity of the water across the pavement and over the backslope would cause severe erosion of the backslope and possibly failure of the structure.

RESERVOIR. The reservoir slopes are in fair condition. Sedimentation within the reservoir is unknown. Very little turbidity was noted at the time of

inspection and the water was clear. The upstream drainage area is estimated to be primarily woodland and pasture. The downstream area of this dam is the tailwater of Grand Valley Dam No. 1. Any failure of Grand Valley Dam No. 2 would be immediately felt by Grand Valley Dam No. 1.

RECOMMENDATIONS. The two most pressing problems of Grand Valley Dam No. 2 are seepage occurring along both sides of the service spillway outlet pipe and along the backslope at the left abutment, and the conditions as outlined under "Emergency Spillway". The seepage along both sides of the outlet pipe should be monitored frequently so that an increase in the flow or material begins to flow with the water, the dam should be drawn down immediately for safety. Portions of the road across the spillway should be altered by either bridging or other methods to make the spillway in the right abutment capable of safely passing the ½ PMF. Vegetation on the downstream slope should be cut so that the slope can be inspected for wet spots and other dangerous conditions. The present conditions of this dam warrants having a qualified engineer look at this dam and determine the safety of the dam.

Wm. E. Bush

William E. Bush, P.E., Director
Civil & Water Resources Engineering
TN License No. 4177

GRAND VALLEY NO. 2

INSPECTION REPORT

Introduction. This is a small earth dam about 500' long and 15' high, located at the headwaters of Grand Valley No. 1 Lake. The dam is about 500 ft long and about 15 ft high. It was built in the 1930's and enlarged in 1965. The soils here are predominantly SC Clayey sands and CL low plasticity clays with chert fragments.

Crest. The crest was paced at 25' wide, and is 5.8 ft above the pool. It is traversed by an asphalt-paved road, and is in good condition.

Service Spillway. The service spillway is located near the left abutment. It consists of a 24" corregated steel pipe passing through the embankment to discharge near the foot of the left abutment. The intake is protected by screen. Water is seeping through the fill at the contact with the pipe at the outlet. Much of the asphalt coating has run off the pipe.

Left Abutment. This is a steep, clayey sand hill that rises a considerable distance above the crest of the dam and extends along the edge of both the upper and the lower reservoir. A fairly deep gulley has formed at the contact between the downstream slope and the abutment. A small seep emerges from the bottom of this gulley, 3 or 4 ft below water level in the pool. The water carries iron oxide. It trickles down the gulley, the base of which is covered with sand washed from above. Several small springs are seeping from the base of the abutment, which probably are not fed by the reservoir.

Downstream Slope. The slope is 1V on 3H and is well covered with grass. The ground is rather rough under the grass. The toe is 150 to 200' from the pool of Lake No. 1. A slight bench runs along most of

length of the dam, a few feet above the toe. Sloughing has occurred about 4' above the toe, some 30' toward the abutment from the outlet pipe. Swamp grass is growing at the toe almost to the right abutment. A damp spot was found at the toe at the bend in the dam. The dam is eroding first downstream from the crest.

Right Abutment. This abutment is a sand hill considerably higher than the crest of the dam. The contact between the abutment and the downstream slope is slightly eroded, but grass covers the area.

Emergency Spillway. An emergency spillway at the right abutment is supposed to discharge into an outfall channel cut into the hill with a slope of about 1V on 2.5H. Apparently, the road across the dam was placed after construction of this outfall, and the road embankment sloping down to the crest of the dam has been built up several feet above the outfall channel and original control section, preventing the spillway from operating.

Upstream Slope. This slope, at about 1H on 3V, is well covered with grass. Near the right abutment is a silted area covered with marsh grass. Marsh grass is growing along the water line for practically the whole length of the dam. About 75' from the right abutment a jug, with slight erosion below it and undercutting at the water line was noted. On further about 125 ft from the right abutment, there were more jugs. Another eroded area was found about 300' from the right abutment. Still another, slightly benched, occurred in the center of the dam. Finally, another eroded area was found about 100' from the left abutment. There were small holes, made by boring animals, just above. The soils here are low plasticity clays of Group CL.

Recommendations. The road should be regraded or else a culvert pipe should be jacked under the road, in order to permit the emergency spillway to act as intended. The seepage at the foot of the left abutment is not serious but should be watched, particularly that occurring at the contact between the service spillway and the adjacent fill. Many dam failures have been started by seepage at this contact. The seepage should be measured about every 3 months by collecting it in a container of known volume. Signs of soil color or suspended matter in the seepage water should be noted particularly. If the rate of seepage increases significantly or if the leakage shows suspended solids, engineering assistance should be secured immediately.

Report Submitted 4/18/81,

F. H. Kellogg, P. E.
Registered Tenn #3760

FHK:lc

APPENDIX E

HYDRAULIC AND HYDROLOGIC DATA

HYDRAULICS AND HYDROLOGIC CALCULATIONS

Grand Valley Dam No. 2 is located in Hardeman County, Tennessee. The present land use is estimated to be 37.5 percent woodland, 56.2 percent open land, and 6.3 percent water. The soil is in the Memphis-Lexington-Loring group and is classified as a "B" soil. The runoff curve number was calculated to be 64 AMC II.

The Grand Valley Dam No. 2 is a small size, high hazard potential dam. As such it is required to pass the p PMF to PMF without overtopping. Using the U.S. Weather Service TP-40, the 6-hour PMP was estimated to be 29.7 inches yielding 23.88 inches runoff (RCN 64 AMC II). The ½ PMF which is derived from the Probable Maximum Precipitation was routed with 11.94 inches of runoff (RCN 64 AMC II).

The total inflow into the reservoir is about 228 acre-feet with a maximum peak of 562 cfs. Grand Valley Dam No. 2 reservoir has a maximum storage from the crest of the service spillway to the top of the dam of 95 acre-feet and a maximum spillway discharge rate of 45 cfs. The impoundment is insufficient to safely pass the ½ PMF.

The 6-hour, 100-year flood containing 5.5 inches precipitation was routed through the dam using a RCN of 81 (AMC III). This produced a runoff of 3.45 inches and a routed peak discharge of 30.6 cfs. Grand Valley Dam No. 2 contained the storm with flows of 3.4 feet and 2.5 feet of freeboard.

The 1-10 day 100-year storm was routed through the structure and did not produce flow over the top of the dam.

The inflow hydrograph was calculated by methods contained in Section 4, Chapter 21, of the SCS National Engineering Handbook. Weir constants in the formula $Q=CLH^{3/2}$ were found in King and Brater "Handbook of Hydraulics", fifth edition. Pipe flow calculations from corrugated steel pipes were made using inlet control as found in the "Handbook of Steel Drainage and Highway Construction Products", 1973 printing. The routing equation used was:

$$I_1 + I_2 + \left(\frac{2S_1}{\Delta t} - O_1\right) = \left(\frac{2S_2}{\Delta t} + O_2\right) .$$

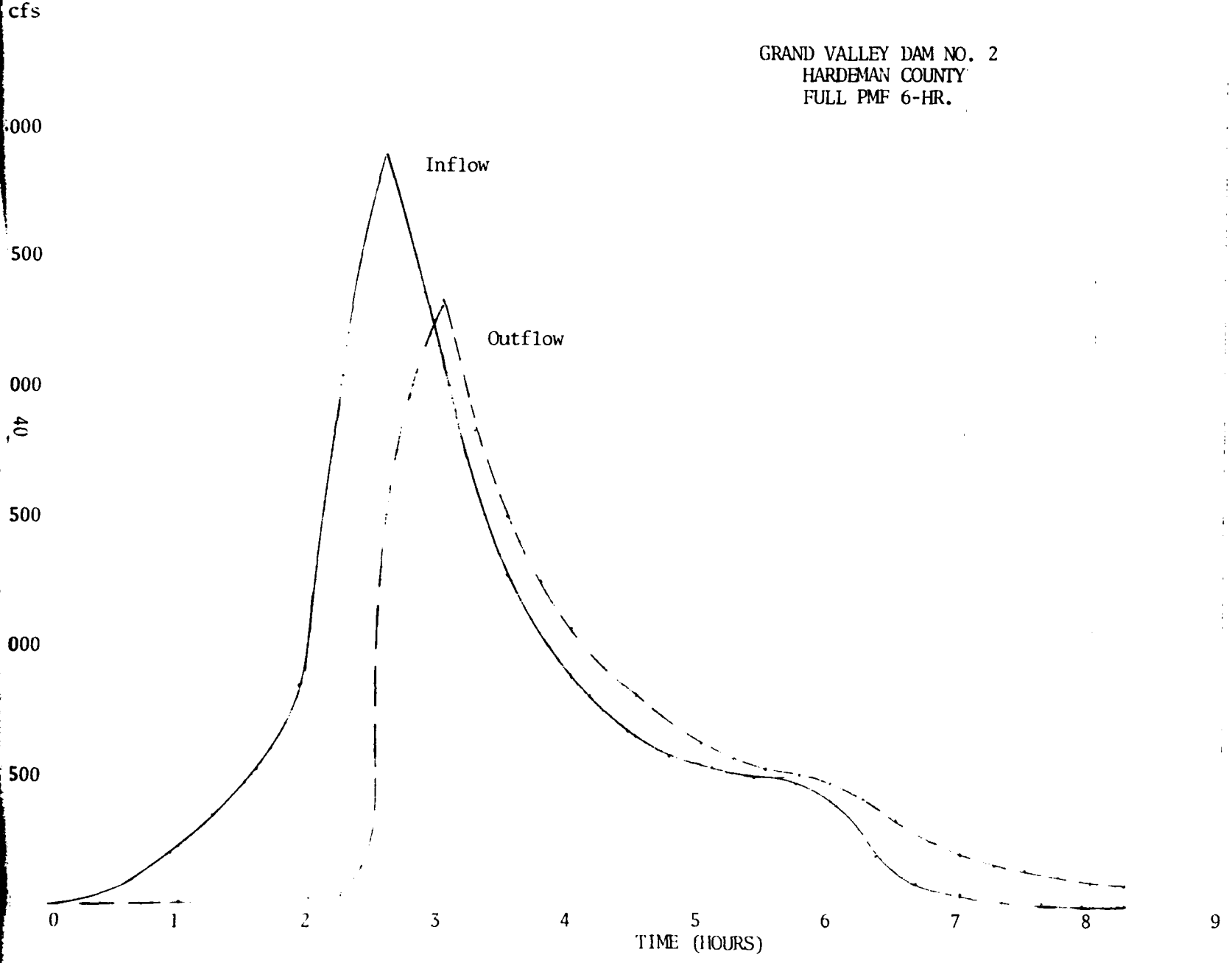
Basic Engineering Data was obtained from the following sources: Engineering surveys of the impoundment structure, U.S. Geologic Survey Topographic Maps; Aerial photographs; USDA Soil Conservation Service Soil Survey Maps; Rainfall Data and Hazard Classification from the Tennessee Division of Water Resources.

HYDRAULIC AND HYDROLOGIC SUMMARY

Frequency of Occurence	Duration	Antecedent Moisture Condition II	III
100-year	6-hour	Will Pass	Will Pass
100-year	10-day	No flow over dam	No flow over dam
½ PMF[1]	6-hour	Will overtop 1.4 feet for 6.5 hours	Will overtop 1.5 feet for 6.5 hours
PMF	6-hour	Will overtop 1.8 feet for 6.6 hours	Will overtop 2.3 feet for 6.7 hours

[1]Probable Maximum Flood

GRAND VALLEY DAM NO. 2
HARDEMAN COUNTY
FULL PMF 6-HR.



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STORM=FULL PMF-[illegible]
TIME INCREMENT IN HOURS = [illegible]

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0.25	20.00	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
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PMF 6-HOURS AMC II

HYDROGRAPH COMPUTATION

DATE May 19, 1981
COMPUTED BY BFS
CHECKED BY

Project Grand Valley Dam No. 2

DR. AREA 0.36 SQ. MI. STRUCTURE CLASS

T_c 0.97 HR. STORM DURATION 6 HR.

POINT RAINFALL 29.7 IN.

ADJUSTED RAINFALL:

AREAL : FACTOR IN.

DURATION : FACTOR IN.

RUNOFF CURVE NO. 64

Q 23.88 IN.

HYDROGRAPH FAMILY NO. 1

COMPUTED T_p 0.679 HR.

T_o 5.68 HR.

(T_o / T_p)

COMPUTED 8.37 ; USED 10

REVISED T_p 0.568

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$(Q*q_p)$ = 7325.44 CFS.

t COLUMN = (t / T_p) REV. T_p q COLUMN = $(q_c / q_p * Q * q_p)$

Q COLUMN = $(Q_t / Q) Q$

	t = (t / T_p) Rev. T_p	q = (q_c / q_p) (Q * q_p)	Q_t = (Q_t / Q) Q
	t HOURS	q CFS	Q INCHES
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2	.32	15	
3	.64	95	
4	.95	198	
5	1.27	344	
6	1.59	520	
7	1.91	842	
8	2.23	2036	
9	2.54	2886	
10	2.86	2359	
11	3.18	1721	
12	3.50	1275	
13	3.82	996	
14	4.14	806	
15	4.45	674	
16	4.77	579	
17	5.09	535	
18	5.41	498	
19	5.73	476	
20	6.04	388	
21	6.36	198	
22	6.68	88	
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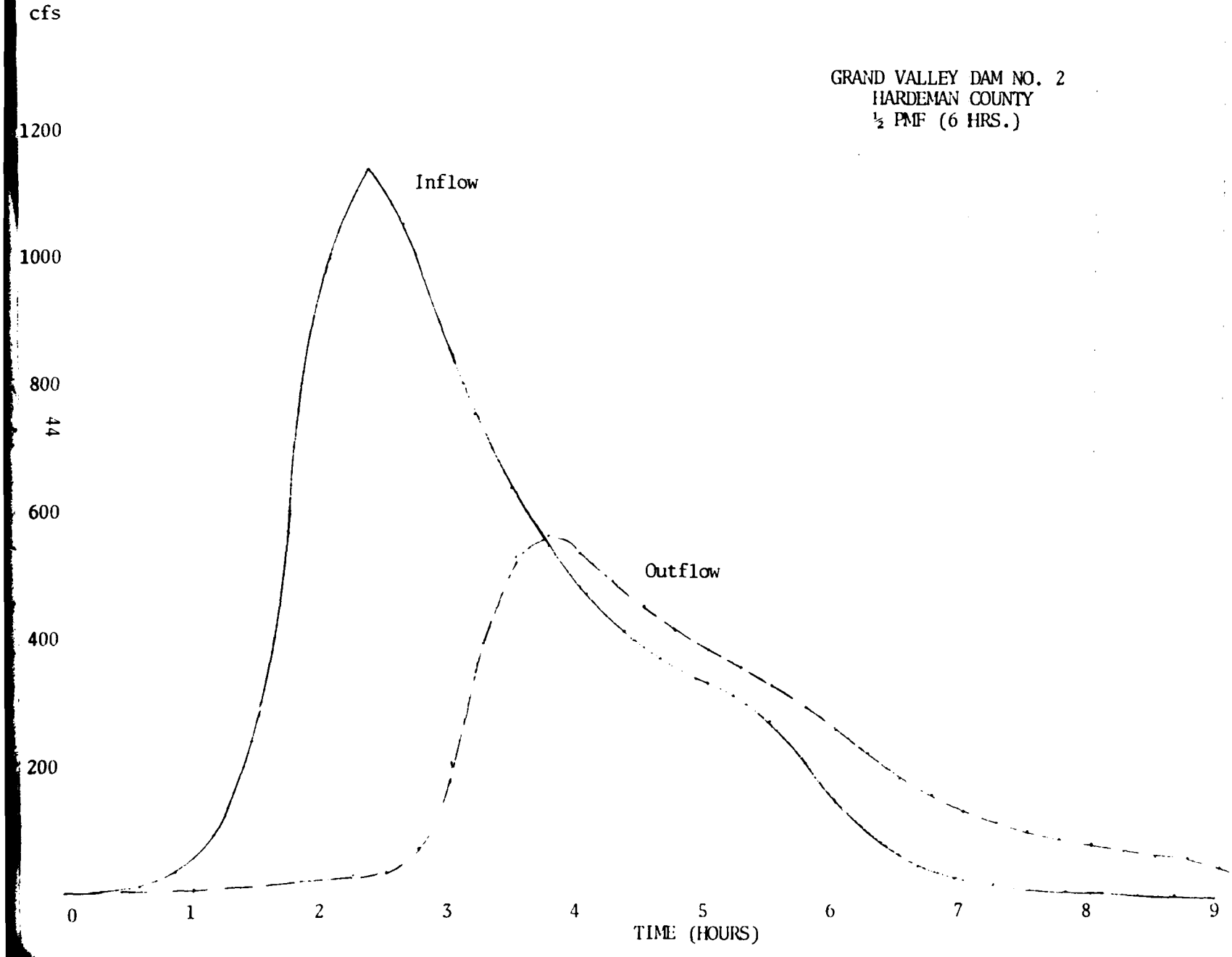
24	7.32	22	
25	7.63	15	
26	7.95	7	
27	8.27	0	
28			
29	Check: 17617 (.32) .36 (645)		= 24.28"
30			
31			
32			
33			
34			

Winsett-Simmonds Construction Associates Inc
821 SOUTH BARKSDALE STREET P O BOX [illegible] MEMPHIS, TENNESSEE 38104
TELEPHONE 901 [illegible]
Systems Engineers



GRAND VALLEY DAM NO. 2
HARDEMAN COUNTY
½ PMF (6 HRS.)

½ PMF (6 HRS.)

HYDROGRAPH COMPUTATION

DATE May 15, 1981
COMPUTED BY BES
CHECKED BY

Project GRAND VALLEY DAM NO. 2

DR. AREA .36 SQ. MI. STRUCTURE CLASS

T_c .97 HR. STORM DURATION 6 HR.

POINT RAINFALL 17.24 IN.

ADJUSTED RAINFALL:

AREAL FACTOR IN.

DURATION FACTOR IN.

RUNOFF CURVE NO. 64

Q 11.94 IN.

HYDROGRAPH FAMILY NO. 2

COMPUTED T_p 0.679 HR.

T_o 5.12 HR.

(T_c / T_p)

COMPUTED 7.54 ; USED 6

REVISED T_p 0.85

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(Q/q_p) = 2447.56 CFS.

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Q(COLUMN) = $(Q_t / Q)Q$

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5	1.16	91	
6	1.45	240	
7	1.73	597	
8	2.02	996	
9	2.31	1136	
10	2.60	1050	
11	2.89	898	
12	3.18	756	
13	3.47	639	
14	3.76	548	
15	4.05	472	
16	4.34	414	
17	4.62	372	
18	4.91	340	
19	5.20	316	
20	5.49	277	
21	5.78	208	
22	6.07	135	
23	6.36	86	
24	6.65	49	
25	6.94	29	
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27	7.51	12	
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34	645 (.36)		

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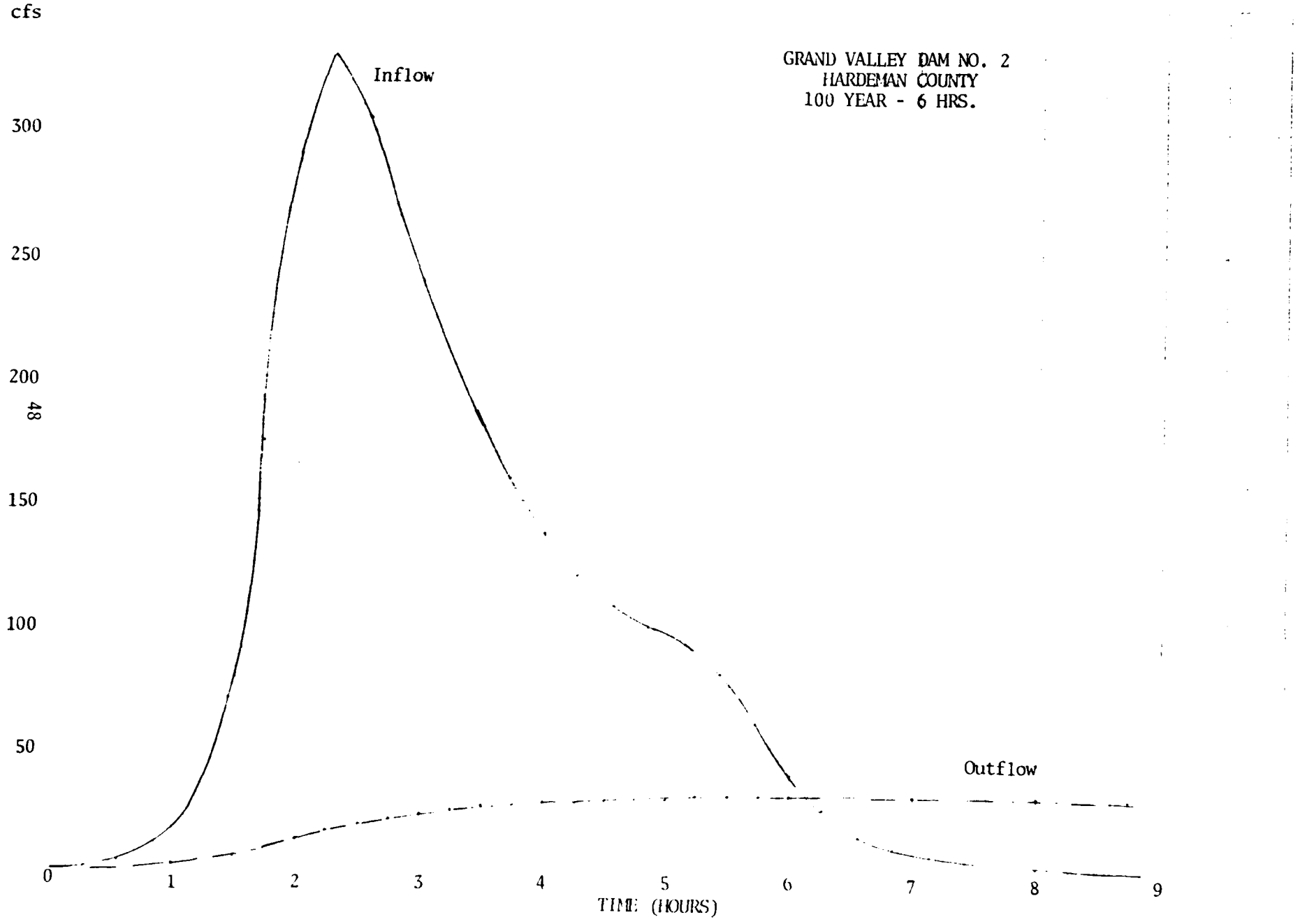
821 SOUTH BARKSDALE STREET P O BOX [illegible] MEMPHIS, TENNESSEE 38104
TELEPHONE 901 [illegible]
Systems Engineers


cfs
300
250
200
150
100
50
0
1
2
3
4
5
6
7
8
9
TIME (HOURS)
Inflow
Outflow
GRAND VALLEY DAM NO. 2
HARDEMAN COUNTY
100 YEAR - 6 HRS.

NAME OF DAM [illegible]

STORM=100 YEAR-6 HOUR[illegible] HRS.
TIME INCREMENT IN HOURS [illegible]

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2.50	[illegible].00	[illegible]
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3.00	[illegible].00	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

100 YEAR - 6 HRS.

HYDROGRAPH COMPUTATION

DATE May 15, 1981
COMPUTED BY BFS
CHECKED BY

Project GRAND VALLEY DAM NO. 2

DR. AREA 0.36 SQ. MI. STRUCTURE CLASS _____

T_c 0.97 HR. STORM DURATION 6 HR.

POINT RAINFALL 5.5 IN.

ADJUSTED RAINFALL:

AREAL : FACTOR _____ IN. _____

DURATION : FACTOR _____ IN. _____

RUNOFF CURVE NO. 81

Q 3.43 IN.

HYDROGRAPH FAMILY NO. 2

COMPUTED T_p 0.679 HR.

T_o 5.05 HR.

$(T_o : T_p)$

COMPUTED 7.44 ; USED 6

REVISED T_p 0.84

$q_p = \frac{484A}{REV.\ T_p} = 207.43$ CFS.

$(Q*q_p) = 711.48$ CFS.

t(COLUMN) = $(t : T_p)$ REV. T_p q(COLUMN) = $(q_c : q_p)*(Q*q_p)$

Q(COLUMN) = $(Q_t : Q)Q$

	t : t T_p | Rev T_p, q : q_c q_p | $(Q*q_p)$ Q_t : $(Q_t$ $Q)Q$		
	t HOURS	q CFS	Q INCHES
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2	.29	1	
3	.57	4	
4	.86	11	
5	1.14	26	
6	1.43	70	
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8	2.00	290	
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10	2.57	305	
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18	4.86	99	
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20	5.43	80	
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24	6.57	14	
25	6.85	9	
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27	7.45	4	
28	7.71	3	
29	8.00	2	
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31	8.57	1	
32	8.85	0	
33	check: 2837 (0.28)		= 3.42"
34	645 (.56)		

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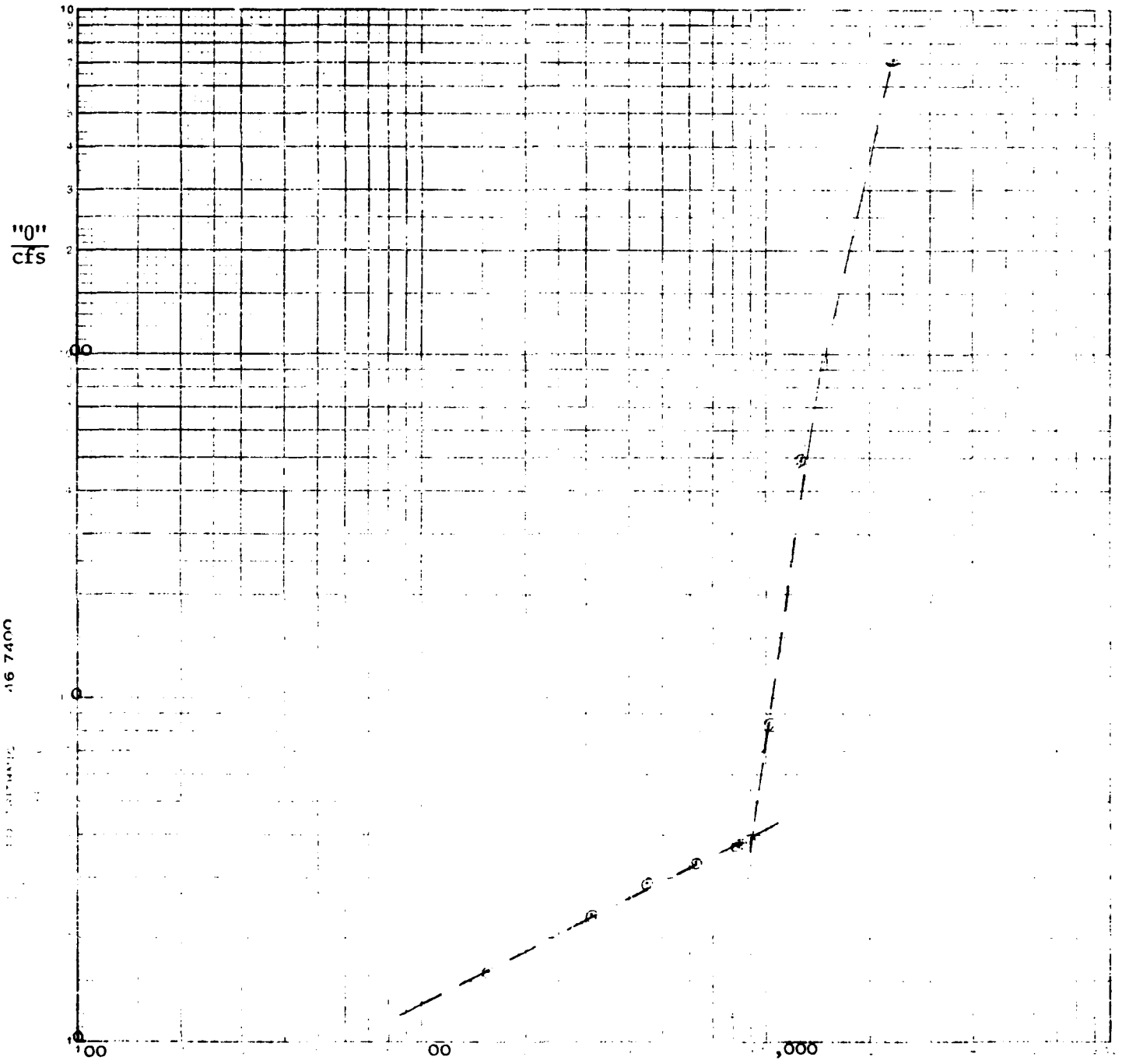
921 SOUTH BARKSDALE STREET P O BOX [illegible] MEMPHIS, TENNESSEE 38104
TELEPHONE 901 [illegible]
Systems Engineers

STORAGE INDICATION CURVE
GRAND VALLEY DAM NO. 2



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FOR [illegible] [illegible]

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 PROJECT [illegible]

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 B [illegible]

 COEF [illegible]

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FOR [illegible]

FOR [illegible]

FOR [illegible]
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A = [illegible]

B = [illegible]

COL = [illegible]

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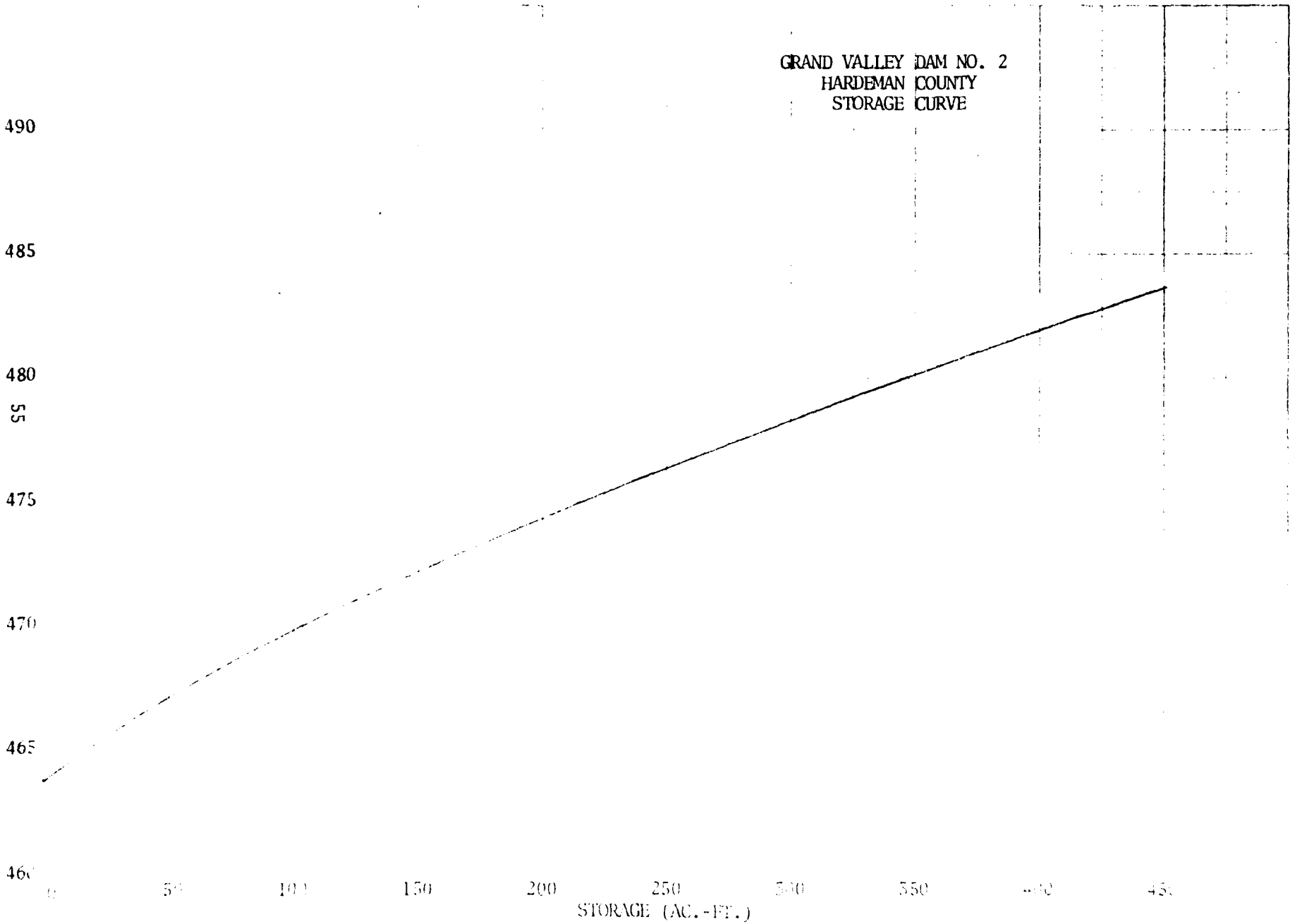
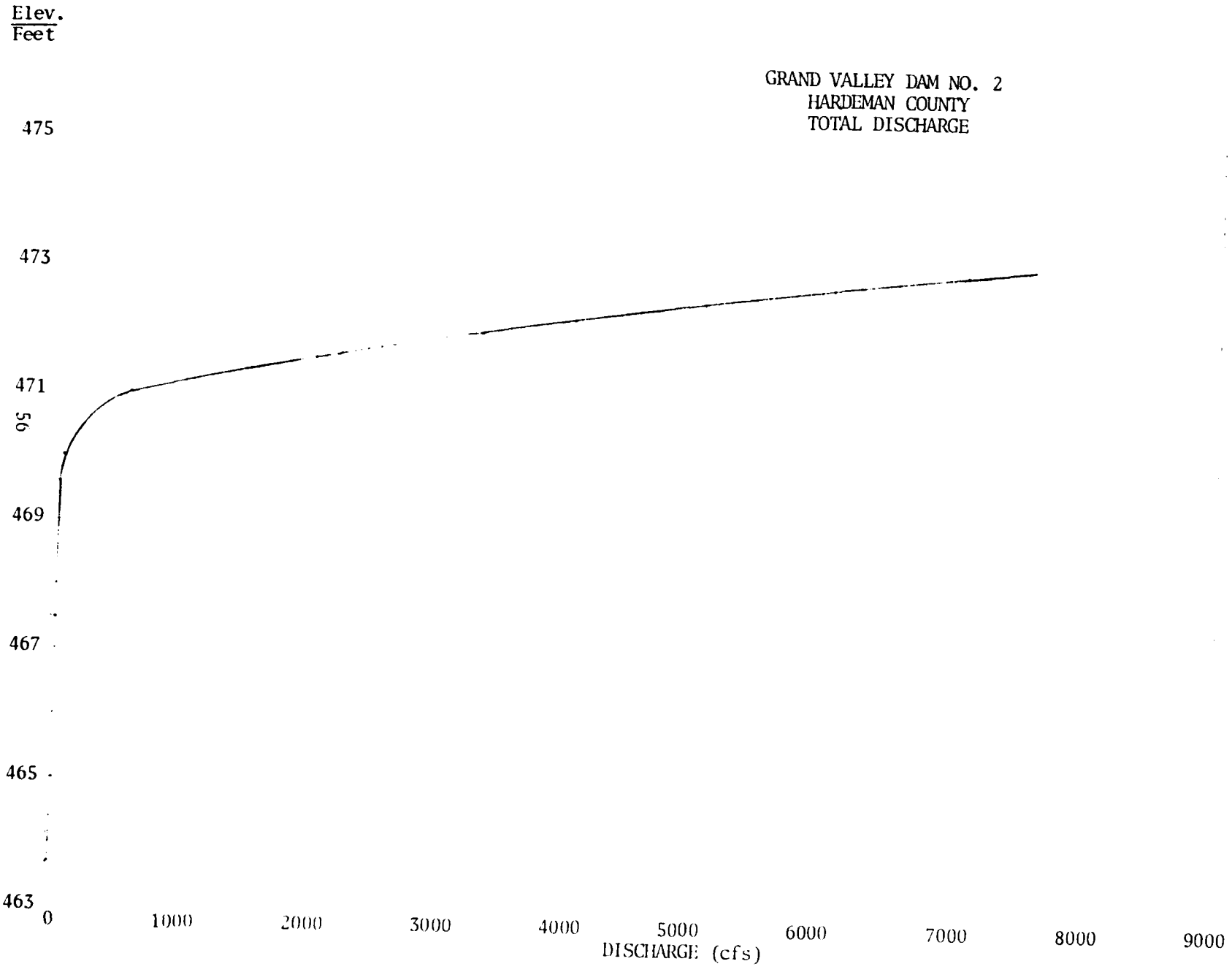
FOR [illegible]

FOR [illegible]

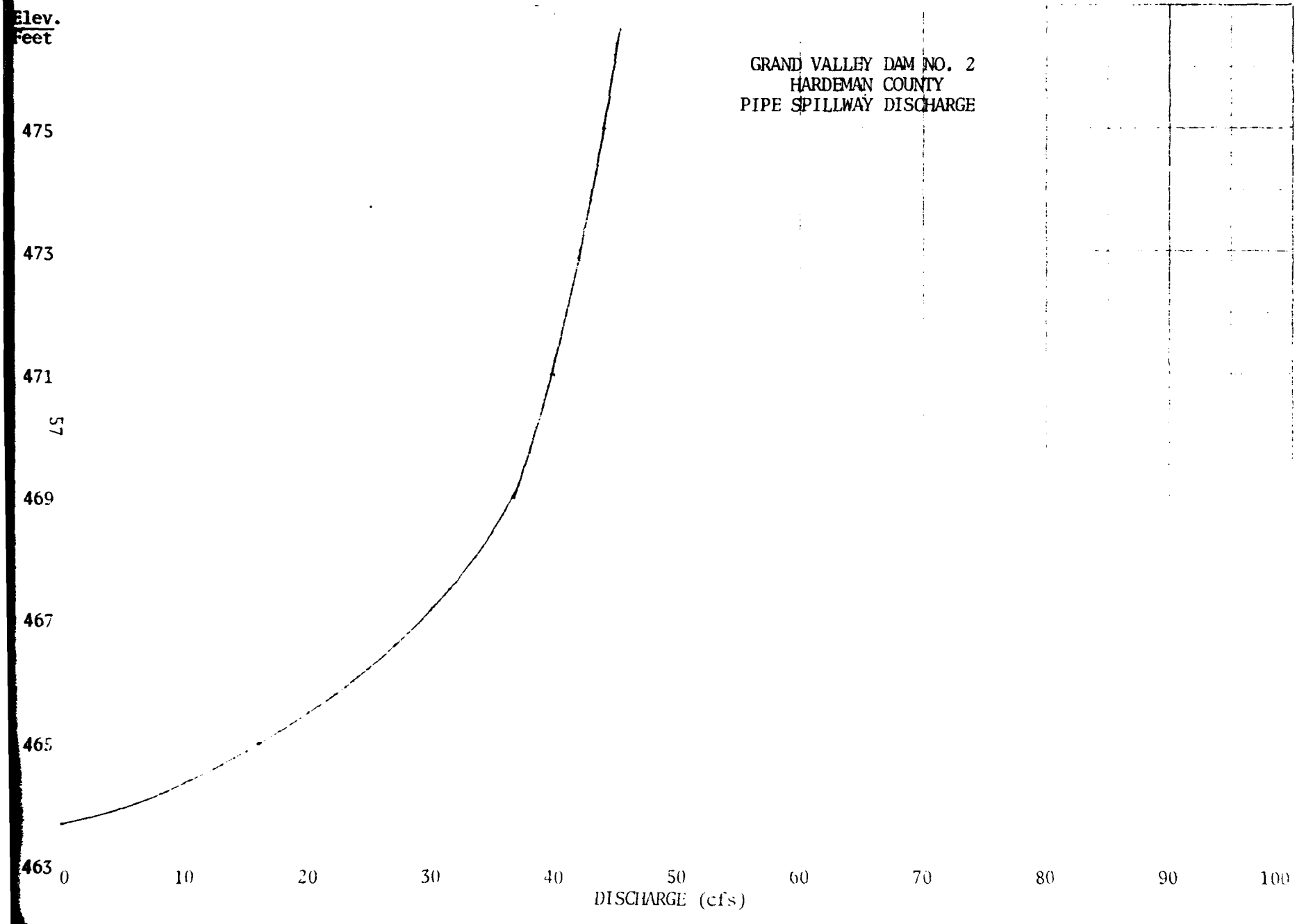
46 0780

GRAND VALLEY DAM NO. 2
HARDEMAN COUNTY
STORAGE CURVE




Elev.
Feet
GRAND VALLEY DAM NO. 2
HARDEMAN COUNTY
TOTAL DISCHARGE
475
473
471
469
467
465
463
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
DISCHARGE (cfs)

4: 0780



GRAND VALLEY DAM NO. 2
HARDEMAN COUNTY
PIPE SPILLWAY DISCHARGE

57

APPENDIX F

DAM INVENTORY DATA SHEET

DAM INVENTORY DATA SHEET
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

ID NUMBERS STATE(ID): 35-7025 FEDERAL(FED ID): TN-6025

NAME(PROJECT): Grand Valley Lake #2 REGION(R): West

OWNER(S): Grand Valley Property Owner's Assn. (Dwayne Williams, Pres.)

ADDRESS: P.O. Box 94, Hickory Valley, TN 38042

TELEPHONE RESIDENCE: BUSINESS: 376-0632

COUNTY: Hardeman QUAD: Grand-Nelson

LOCATION LATITUDE: 35° 08' 43", LONGITUDE: 89° 03' 20"

STREAM(SOURCE): Gin Pond Branch RIVER MILE: BASIN: 42B

PURPOSE OF DAM: Private recreation YEAR COMPLETE: 1956 ±

CONTRACTOR(CONT): LOCATION:

ENGINEER(ENG): LOCATION:

TYPE OF DAM(TYC): Earth(asphalt road along crest) SIZE CLASSIFICATION:

DOWNSTREAM HAZARD POTENTIAL CLASSIFICATION STATE(H) 1 FEDERAL(FH) High

CERTIFICATE EXPIRATION DATE(EXP DATE):

STRUCTURAL HEIGHT(SHT): 17 FEET, HYDRAULIC HEIGHT(HHT): 11.7 FEET

CREST LENGTH(LGTH): 550 FEET, CREST WIDTH(WDTH): 20 FEET

UPSTREAM SLOPE(U/S): 3.9 :1, DOWNSTREAM SLOPE (D/S): 3.2 :1

POOL AREA NORMAL(NSURF): 13.3 ACRES, MAXIMUM(M/SURF): 13.3 ACRES

	ELEVATION(FEET MSL),	STORAGE CAPACITY(ACRE-FEET)
TOP OF DAM	(ELEV1) 470.3 ,	(TO/STR) 141.7
EMERGENCY SPILLWAY CREST	(ELEV2) ,	(EM/STR)
NORMAL POOL	(ELEV3) 465 ,	(N/STR) 64.6

EMERGENCY SPILLWAY MATERIAL(ESM): , SIZE(SZ):

SERVICE SPILLWAY MATERIAL(SSM) CMP , SIZE(SZ) 2'

DRAINAGE AREA(DA): 0.39 SQ. MILES, CURVE NUMBER(CN): AMCII

TIME OF CONCENTRATION(TC): HOURS, MAXIMUM 6-HR RAIN: INCHES

COMMENTS: INVENTORIED BY: Staff DATE: 1973

REVISED BY: Roe & Armstrong DATE: 6/9/80 D/S HAZARD BY: Armstrong DATE: 6/9/80

OTHER NAME OF PROJECT: POOL AREAS OBTAINED BY: Planimeter from t

OTHER CONTACT AT DAM: PHONE:

DATA OBTAINED FROM: Field survey; Book 5W

EMER. SPIL. DESC.:

SERV. SPIL. DESC.: 2' diameter CMP through dam

ELEVATIONS REF. TO: Water surface APPROX ELEV: 465 FT MSL

DRAWDOWN DRAIN: MATERIAL: None SIZE: ELEVATION:

OTHER COMMENTS: Extensive improvements made since 1973. Spillway empties into Grand Valley Lake #1.

APPENDIX G

HAZARD POTENTIAL

AND

CONDITION CLASSIFICATION DEFINITIONS

DEPARTMENT OF THE ARMY

OFFICE OF THE CHIEF OF ENGINEERS

HAZARD POTENTIAL CLASSIFICATION*

Category	Loss of Life	Economic Loss
Low	None expected (No permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
High	More than few	Excessive (Extensive community, industry or agriculture)

*U.S. Army Corps of Engineers, Recommended Guidelines for Safety Inspection of Dams.

TENNESSEE DEPARTMENT OF CONSERVATION

DIVISION OF WATER RESOURCES

DAMAGE POTENTIAL CATEGORY*

Category	Description
1.	Dams located where failure would probably result in any of the following: loss of human life; excessive economic loss due to damage of downstream properties; excessive economic loss, public damage to roads or any public or private utilities.
2.	Dams located in predominantly rural or agricultural areas where failure may damage downstream private or public property but such damage would be relatively minor and within the general financial capabilities of the dam owner. Public hazard or inconvenience due to loss of roads or any public or private utilities would be minor and of short duration. Chances of loss of human life would be possible but remote.
3.	Dams located in rural or agricultural areas where failure may damage farm buildings or agricultural land but such damage would be more or less confined to the dam owner's property. No loss of human life would be expected.

* Tennessee Department of Conservation, Division of Water Resources, Rules and Regulations Applied to the Safe Dams Act of 1973. Chapter 0400-4-1.

DEFINITION OF CONDITION CLASSIFICATION

"Unsafe - Emergency" - A dam in a state of imminent failure. State and local authorities and downstream residents should be advised immediately, reservoir drained, or combination of the above (e.g., advanced piping, major slope instability, recent sudden collapse of a portion of the foundation, imminent overtopping, etc.).

"Unsafe - Nonemergency" - A dam with obviously serious deficiencies which clearly could develop, or are developing, into failure modes but do not yet pose the threat of imminent failure. State and local authorities should be advised promptly and remedial work should begin as soon as practical. Someone should be assigned to periodically check on the dam's condition until remedial work is begun. Drawing down the reservoir should be considered, e.g., flowing seepage from embankment which could lead to piping, evidence of solution channels or cavitation in the foundation, seriously inadequate spillway capacity as per ETL 1110-2-234, history of recurring slope instability, etc.).

"Significantly Deficient" - A dam with deficiencies which, if left unchecked, would likely become serious deficiencies and could ultimately result in failure. Advise State authorities and recommend remedial work be scheduled in time to prevent substantial further deterioration of the condition(s)--usually within six months to a year or sooner (e.g., heavy growth of sizeable trees on slopes, potentially serious erosion, spillway discharge channel too close to embankment, etc.).

"Deficient" - A dam with deficiencies which need attention but which would not likely effect the safety of the dam unless left unchecked for a long period of time. Advise State authorities and recommend remedial action at owner's convenience but before the problem can escalate into a significant deficiency (e.g., brush and/or few or very small trees on embankment, long term deterioration of masonry or metal outlet features, formation of deep ruts in embankment roadway, deterioration of riprap, etc.).

"Not Deficient" - Well constructed and maintained dam with no apparent deficiencies relative to its safety and structural integrity.

APPENDIX H

CORRESPONDENCE

ORNED-G

NON-FEDERAL DAM INSPECTION REVIEW BOARD
PO BOX 1070
NASHVILLE, TENNESSEE 37202

Commander, Nashville District
US Army, Corps of Engineers
PO Box 1070
Nashville, TN 37202

1. The Interagency Review Board, appointed by the Commander on 19 June 1981, presents the following recommendations after meeting on 16 July 1981, to consider the Phase I investigation report on Grand Valley Dam No. 2 performed by Winsett-Simmonds, Consterdine & Associates, Inc., under contract to the Tennessee Department of Conservation.

2. Recommendation c should also have the qualified engineer design remedial measures after the cause of seepage has been determined.

3. The owner should periodically check for signs of beavers blocking the spillway intake.

4. The Board is in agreement with other report conclusions and recommendations following minor revisions.

FRANK B. COUCH, JR.
Chief, Geotechnical Branch
Chairman

BOBBY G. MOORE
Assistant State Conservation Engineer
Alternate, Soil Conservation Service

EDMOND B. O'NEILL
Alternate, Division of Water Resources
State of Tennessee

THOMAS N. PORTER
Hydraulic Engineer
Alternate, Hydrology and Hydraulics Branch

EDWARD B. BOYD
Hydrologic Technician
Alternate, US Geological Survey

BRADLEY B. HOOT
Chief, Structural Section
Alternate, Design Branch

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

31 JUL 1981

IN REPLY REFER TO

ORNED-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Please be informed of the results of an inspection, under authority of Public Law 92-367, conducted on Grand Valley Dam No. 2 in Hardeman County, Tennessee. An inspection team, composed of personnel from Winnsett-Simmonds, Consterdine and Associates, Inc., and a member of your Division of Water Resources, observed conditions which indicate a high potential for failure of the embankment dam due to seriously inadequate spillway capacity and other serious deficiencies.

Grand Valley Dam No. 2 is classified as a high hazard potential, small size dam and, as such, should be able to regulate a one-half probable maximum flood (1/2 PMF) to conform to inspection program guidelines. A hydraulic analysis of the project's spillway showed the dam would be substantially overtopped by a one-half full probable maximum flood.

Based on the results of the visual inspection and due to the seriously inadequate spillway capacity, the dam is considered unsafe. While I do not view this as an emergency at this time, I recommend you initiate prompt action by the State to cause the owner to correct the deficiencies as soon as practical to minimize the risk to the mobile home subdivision located downstream.

A report of the technical investigation will be furnished your office upon completion.

Sincerely,

LEE W. TUCKER
Colonel, Corps of Engineers
Commander

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220